

An MPI concept with efficient control of network functionality based on SDN

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Nowadays, Message Passing Interface's collective communication suffers on a large-scaled cluster.

Previous works

Our previous works achieve to boost Message Passing Interface (MPI) collective communications up leveraging Software Defined Networking.

- MPI_Bcast
- MPI_Allreduce
- MPI_Reduce

Software Defined Networking (SDN): In SDN architecture, there is Network Controller which is responsible for controlling network devices and packets. Network Controller controls network devices and packets by sending control rules to network devices.

Software Defined Networking

1. Centralized to one logical place

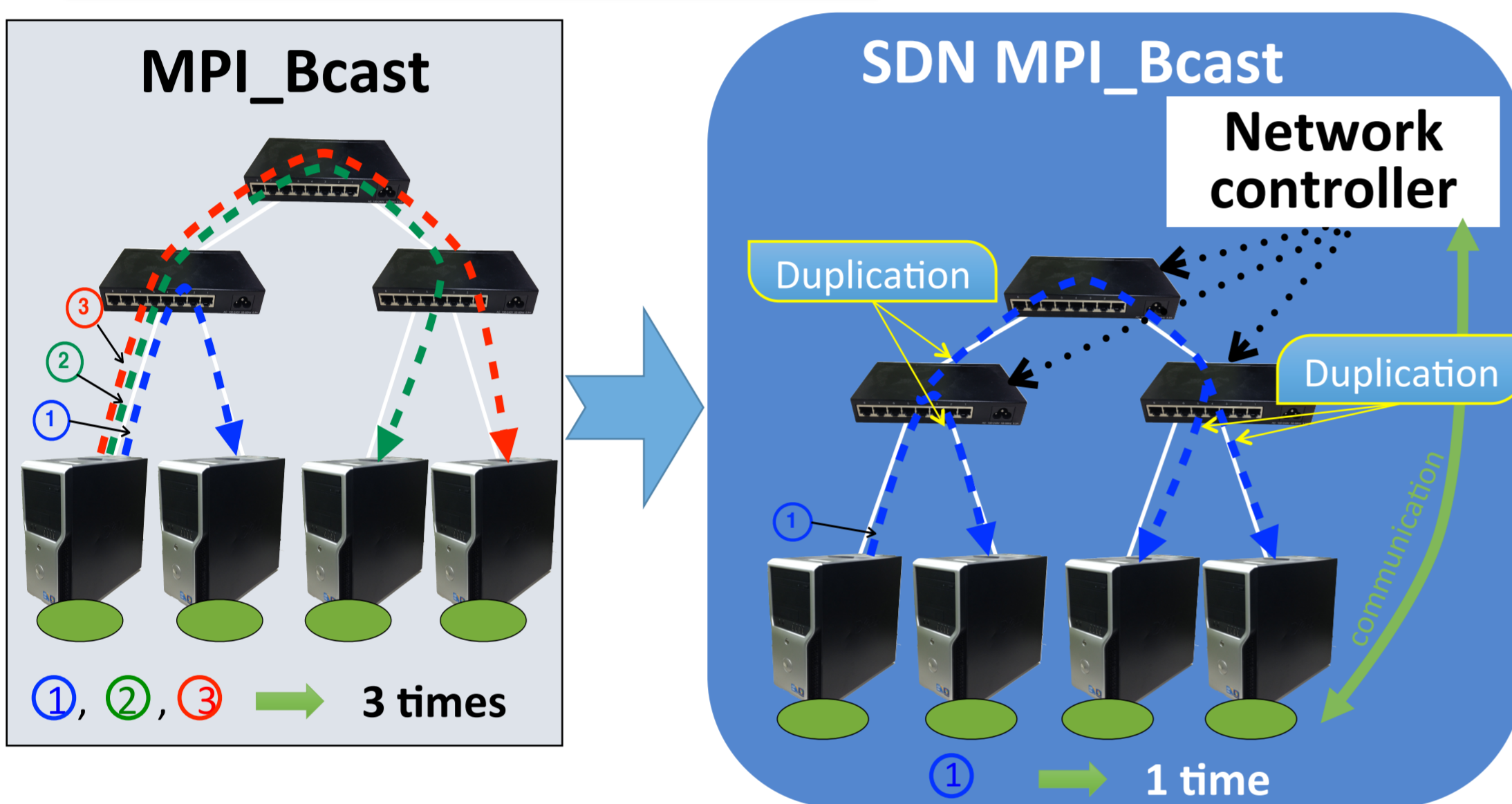
Network Controller

2. Programmable

3. Dynamically controllable

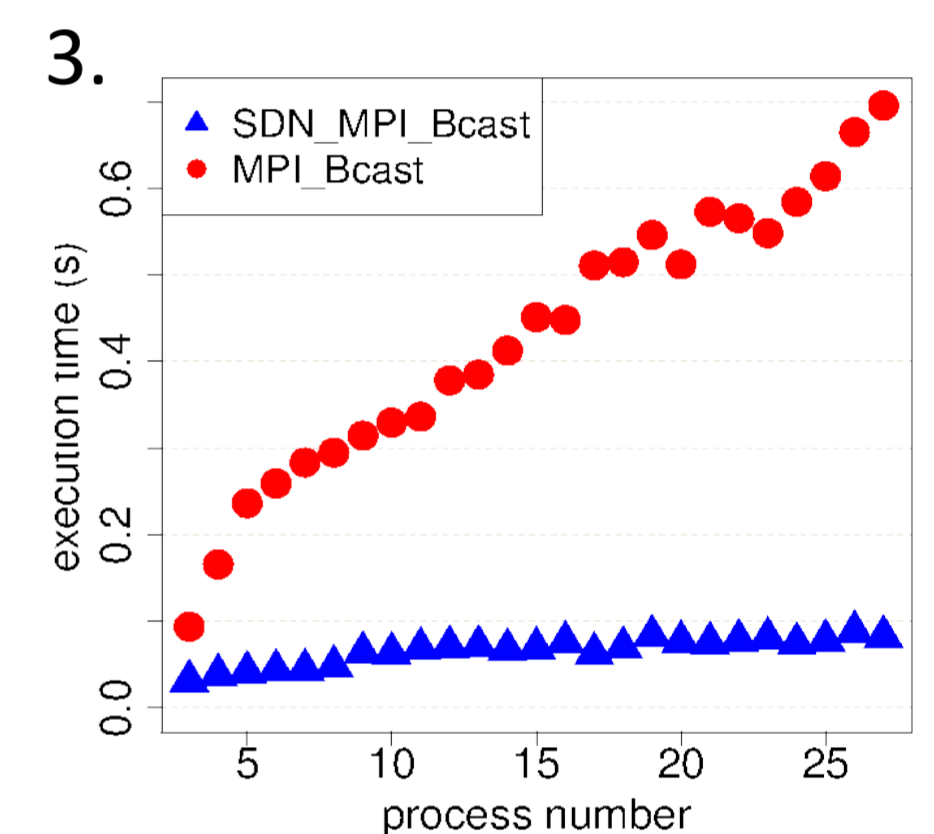
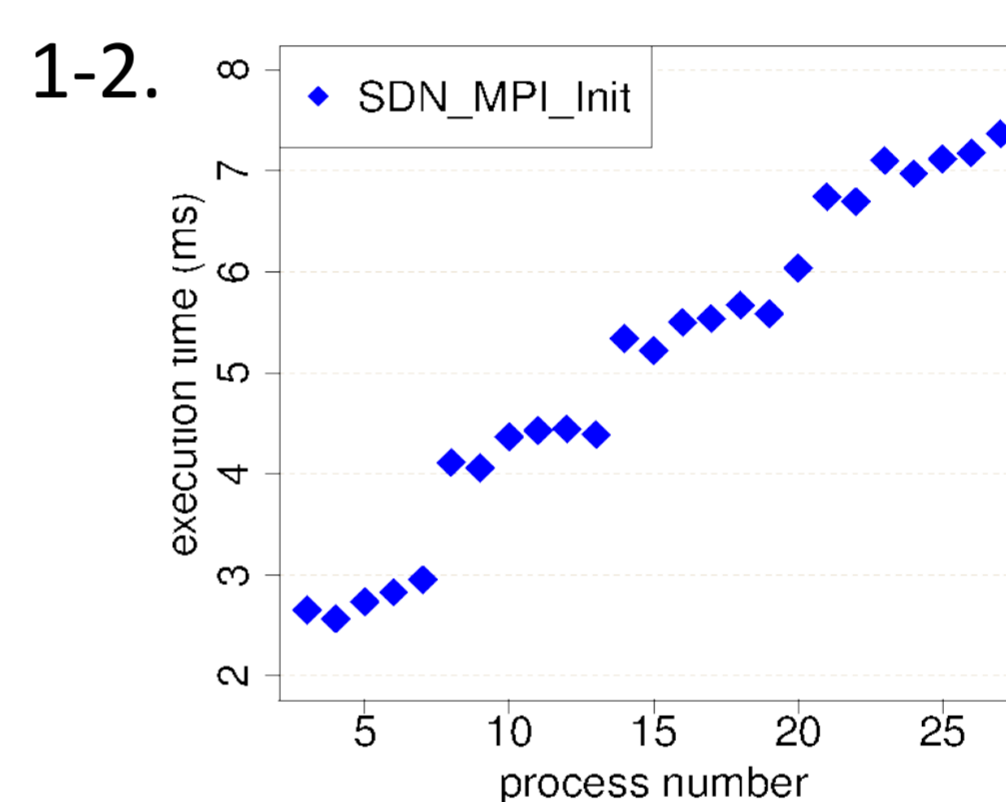


SDN MPI_Bcast



Experiment Result

1. Identify broadcasting computers to Network controller.
2. Install duplication rules to switches.
3. Start broadcasting.



Research Goal

To design general SDN MPI framework with collective communication boosting methods.

- Network controller allows to add new boosting method of collective communication.
- Centralized communication between Network controller and MPI application.
- Identification of network flows of collective communications from others.

